

How to reach 6-log₁₀ biocharge reduction with Phileas® technology in a full airlock transfer?

Animal research lab, 30 m³ airlock transfer

Objective

The objective of this project is to validate a new provider for airborne surface disinfection solutions, as a replacement of ageing material. A real-life test is set up in an airlock with maximal charge and challenging BI locations. Phileas® 75 is tested with O2SAFE (7.4%) at two dosages.

Airlocks are decontaminated in the following cases:

- ✓ Daily equipment/material entry,
- ✓ When the type of micro-organisms has drastically changed,
- ✓ After a serious spill of dangerous micro-organisms,
- ✓ In case of emergency, allows the faster entry of material for intervention.

Material & Equipment

Item	Specification	Remarks
Diffuser	Phileas® 75	DEVEA/Flow rate: 1200mL/hr
Disinfectant	O2SAFE 7.4% H ₂ O ₂	DEVEA/dosage: 14 & 9 mL/m ³
Biological Indicator (BI)	- Apex Biological Indicator for Gaseous - Hydrogen Peroxide - <i>Geobacillus Stearothermophilus</i>	1.8.10 ⁶ CFU per stainless steel carrier D value = 1.5 minutes
Culture Media	Tryptic soy broth	55-60°C for 7 days



BI locations

12 BI have been positioned in the airlock before the diffusion: **on the floor, on the bags, higher on the wall.**

4 **additional non-challenging BI** have also been placed: within the airlock equipment: inside a PC, inside a basket full of pouches (see below) and under a pallet.



Airlock decontamination

Protocol steps:

1. Place generator on the working place
2. Close the airlock
3. Start cycle diffusion, contact time & aeration
4. After ventilation, remove indicators and deliver them to the laboratory for sterility testing – reading after 7 days at 55-60°C

Estimated volume of disinfectant:
 $30 \text{ (m}^3\text{)} * 9 \text{ to } 14 \text{ (mL/m}^3\text{)} = 270 \text{ to } 420 \text{ mL}$

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Biodecontamination cycle

N°	Cycle	Time (hh:mm)	Remarks
1	H ₂ O ₂ Diffusion	00:13 to 00:21	Initial T°: 15-20°C, initial hygrometry: 36-48%
2	Contact time	02:00	H ₂ O ₂ 4hrs after diffusion: 31 to 85ppm
3	Ventilation	01:40 to 02:15	No active ventilation: rest then opening airlock door
	TOTAL	04:00 to 04:30	longest total time with 9mL diffusion

Results

Dose	Phileas® Location	BI 1-12	BI 13* computer	BI14* basket	BI15* basket	BI16* under pallet
14 mL/m ³	Center	-	-	-	-	-
14 L/m ³	Entrance	-	-	-	+	-
14 mL/m ³	Entrance	-	+**	+	-	-
14 mL/m ³	Entrance	-	-	-	-	-
9 mL/m ³	Entrance	-	+	+	-	-

* Only Biological Indicators locations 1 to 12 were challenging. BI 13 to 16 were not challenging (optional), but nice to have

** Positive after 4 days, very close to 6 log destruction

Conditions

- ✔ Diffuser Phileas® 75
Flow rate 1200mL/hr
- ✔ Disinfectant O2SAFE® 7.4% H₂O₂
doses 9 & 14 mL/m³ – 2 hrs contact
- ✔ 30 m³ airlock
- ✔ 16 6-log Biological Indicators



Conclusions

- ✔ The Phileas® 75 generator / O2SAFE® hydrogen peroxide disinfectant are an effective airlock decontamination solution up to **6 log₁₀ biocharge reduction, even in the most difficult to reach locations.**
- ✔ Phileas® solutions have been selected by the production plant as the airborne surface disinfection provider against the other two providers.
- ✔ As a general rule, **center placement** of Phileas® ensures the optimum diffusion repartition and results.
- ✔ During the qualification process, it is relevant to try several doses and contact time to reach challenging and non-challenging requirements, and taking into account security margins.

